

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) An electrolytic phosphate chemical treatment method of forming a film composed of a phosphate compound and a metal that is reduced and precipitated from an ionic state on the surface of a metal material article to be treated, comprising:

performing the electrolytic phosphate chemical treatment on said metal material article in a phosphate chemical treatment bath by contacting said metal material article with said phosphate chemical treatment bath containing

_____phosphate ions,

_____phosphoric acid,

_____nitrate ions,

_____metal ions that form a complex with the phosphate ions and phosphoric acid in said phosphate chemical treatment bath, and

_____metal ions, wherein a ~~for which the~~ dissolution-precipitation equilibrium potential at which the metal ions ~~dissolved~~ in said phosphate chemical treatment bath are reduced and precipitate as metal is equal to or greater than -830 mV, which is the cathodic reaction decomposition potential of water when indicated as a hydrogen standard electrode potential,

_____wherein

the electrolytic phosphate chemical treatment involves the application of voltage and current from an external power supply, and cathodic electrolysis is carried out using the metal material article for the cathode;

the phosphate chemical treatment bath has a pH of 2.5 or lower and is substantially free of metal ions, other than those which are a component of the film, which will form sludge;

Fe is present and an amount of Fe ions dissolved in the phosphate chemical treatment bath is controlled by changes in the amount of Fe ions dissolved into the phosphate chemical treatment bath from a Fe ion source, the Fe ion source being at least one of (1) an electrode (when said electrode comprises Fe) and (2) the metal material article to be treated (when the metal article to be treated comprises a steel material,) so that the phosphate chemical treatment bath does not contain Fe^{3+} ions in an amount of more than the solubility limit;

NO_2 and/or N_2O_4 ~~gas~~ ~~gasses~~ generated and dissolved in the phosphate chemical electrolytic treatment bath during the electrolytic treatment ~~is~~ ~~are~~ removed from the treatment bath by separating a treatment tank into an electrolytic treatment tank where that carries out the electrolytic treatment is carried out and an auxiliary tank where no that does not carry out electrolytic treatment is carried out, circulating the treatment bath between the two tanks, and providing a mechanism that opens the treatment bath liquid to the atmosphere at a reduced pressure either between the two tanks or within the two tanks, as a means of separating the NO_2 and/or N_2O_4 gas ~~formed in the treatment accompanying electrolytic treatment~~ from the treatment bath; and

the oxidation-reduction potential (ORP) of said phosphate chemical treatment bath, indicated as the potential relative to the hydrogen standard electrode potential, is maintained at 770 mV to 960 mV, and is used to monitor the phosphate chemical treatment bath.

2. (Currently Amended) The electrolytic phosphate chemical treatment method according to claim 1, wherein said electrolytic treatment uses for an electrode material that

dissolves in the phosphate chemical treatment bath the metal ions that form a complex with the a-phosphoric acid and the phosphate ions in the phosphate chemical treatment bath, a the metal material wherein a for which the dissolution-precipitation equilibrium potential at which the metal ions dissolved in the phosphate chemical treatment bath from the metal material are reduced and precipitate as the metal is greater than or equal to -830 mV, or a metal material that is insoluble during the electrolytic treatment.

3. (Currently Amended) The electrolytic phosphate chemical treatment method according to claim 1, wherein the amount of Fe ions dissolved into the phosphate chemical treatment bath provides that said ORP of the phosphate chemical treatment bath is 800 mV to 960 mV and maintains the amount of Fe ions within the a-solubility limit of Fe^{3+} ions.

4. (Previously Presented) The electrolytic phosphate chemical treatment method according to claim 1, wherein the amount of Fe ions dissolved into the phosphate chemical treatment bath provides that said ORP of the phosphate chemical treatment bath is 770 mV to 960 mV.

5. (Previously Presented) The electrolytic phosphate chemical treatment method according to claim 1, comprising a second electrode used in the electrolytic treatment for making the ORP of the phosphate chemical treatment bath 770 mV to 960 mV, and wherein said second electrode is an insoluble metal material.

6-7. (Canceled)

8. (Previously Presented) The electrolytic phosphate chemical treatment method according to claim 1, wherein the metal ions that form a complex with the phosphate ions and phosphoric acid in the phosphate chemical treatment bath are at least one of Zn, Fe, or Mn ions.

9. (Canceled)

10. (Previously Presented) The electrolytic phosphate chemical treatment method according to claim 1, wherein the auxiliary tank that does not carry out the electrolytic treatment has a mechanism in which the treatment liquid is passed through a permeable solid structure.

11. (Original) The electrolytic phosphate chemical treatment method according to claim 10, wherein the solid structure is a film.

12. (Previously Presented) The electrolytic phosphate chemical treatment method according to claim 1, wherein a filter having a mechanism that filters the treatment liquid is used for the auxiliary tank that does not carry out the electrolytic treatment.

13. (Currently Amended) The electrolytic phosphate chemical treatment method according to claim 1, wherein the circulating comprises further comprising removing, through a liquid circulation circuit, a portion of the treatment bath liquid at a location prior to being introduced into a filter material in a filter, wherein the auxiliary tank includes the filter material of the filter and the removed portion of the treatment bath is fed to the filter material of the filter via the liquid circulation circuit, and wherein the removed portion of the treatment bath is returned exposing the removed treatment liquid to the atmosphere, and returning it to the electrolytic treatment tank after separating the NO₂ and N₂O₄ present in the removed portion of the treatment liquid bath.

14. (Canceled)

15. (Previously Presented) The electrolytic phosphate chemical treatment method according to claim 1, wherein the treatment bath is maintained in a constant state by measuring an oxidation-reduction potential value of the treatment bath and changing an amount and/or composition of replenishing chemical corresponding to the change in that value.

16. (Previously Presented) The electrolytic phosphate chemical treatment method according to claim 1, wherein the ORP of said phosphate chemical treatment bath is maintained at 800 mV to 960 mV.

17-18. (Canceled)

19. (Currently Amended) The electrolytic phosphate chemical treatment method according to claim 1, wherein when ~~performing the cathodic electrolysis of said article to be treated using the a-Fe electrode in the cathodic electrolysis for an anode~~, the cathodic electrolysis is controlled by controlling the amount of Fe^{2+} ions dissolved into the phosphate chemical treatment bath from said Fe electrode ($\text{Fe} \rightarrow \text{Fe}^{2+} + 2\text{e}^-$) so that the phosphate chemical treatment bath does not contain Fe^{3+} ions more than the solubility limit when said Fe^{2+} ions are oxidized to Fe^{3+} ions ($\text{Fe}^{2+} \rightarrow \text{Fe}^{3+} + \text{e}^-$).